Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for producing a metal ion-specific capacity affinity sensor suitable for determining the presence of a certain heavy metal ion of interest in a contacting solution by capacitance measurement, comprising the steps of:

a) providing a piece of a noble metal having a surface;

b) providing a first self-assembling monolayer-forming molecule comprising a coupling group;

c) contacting said noble metal piece in step a) with the first self-assembling monolayer-forming molecule in step b), thereby obtaining a first self-assembling monolayer on said surface of said noble metal piece;

d) contacting said first self-assembling monolayer on said noble metal piece with a molecule specifically binding said heavy metal ion, thereby coupling said molecule to said first self-assembling monolayer; and

e) contacting the piece obtained in step d) with a second self-assembling monolayer-forming molecule, thereby obtaining a noble metal surface that is at least 90% covered with a self-assembling monolayer.,

wherein the coupling reaction in step d) is carried out in presence of polyethylene-glycol-di-glycidyl-ether.

2. (Cancelled)

3. (Previously Presented) A method according to claim 1, characterized in that said noble metal piece is exposed to a solution containing a crosslinking substance prior to step d).

4. (Previously Presented) A method according to claim 1, characterized in that said first self-assembling monolayer-forming molecule is D/L-thioctic acid, and in that said D/L-thioctic acid is activated with 1-(3-dimethylaminopropyl)-3-ethyl-carbodiimide before step d) is carried out.

5. (Previously Presented) A method according to claim 1, characterized in that said second self-assembling monolayer-forming molecule is a thiol comprising 3-25 carbon atoms in a straight saturated chain.

6. (Currently Amended) A metal ion-specific capacity affinity sensor comprising a piece of a noble metal having a surface to which molecules specifically binding a certain heavy metal ion of interest have been bound, characterized in that said molecules specifically binding to said heavy metal ion are coupled to a self-assembling monolayer covering at least 90% of said surface of said noble metal piece, and characterized in that said sensor has been produced by a method according to any one of claims 1 and 3-5.

7. (Previously Presented) A sensor according to claim 6, characterized in that said molecules specifically binding to said heavy metal ion are selected from the group of proteins consisting of SEQ.ID.NO.1, SEQ.ID.NO.2, SEQ.ID.NO.3, SEQ.ID.NO.4, and functional derivatives thereof, wherein the functional derivatives have binding characteristics equivalent to SEQ.ID.NO.1, SEQ.ID.NO.2, SEQ.ID.NO.3, or SEQ.ID.NO.4.

8. (Previously Presented) A method for qualitatively determining the presence of a certain heavy metal ion of interest in a liquid sample, comprising the steps of:

a) providing a sensor according to claim 6;

b) contacting said sensor with a reference liquid not containing said heavy metal ion of interest and determining the capacitance;

c) contacting said sensor with a liquid sample suspected of containing said heavy metal ion of interest and determining the capacitance; and

d) calculating the difference between the capacitance of the liquid sample and the capacitance of the reference liquid.

9. (Previously Presented) A method according to claim 8, wherein said heavy metal ion of interest is selected from the group consisting of Zn^{2+}, Hg^{2+}, Cd^{2+}, Cu^{2+}, and Pb^{2+}.

10. (Cancelled)

11. (Previously Presented) A method according to claim 1, wherein said piece of a noble metal in step a) is a rod.

12. (Previously Presented) A method according to claim 1, wherein said piece of a noble metal in step a) is a piece of insulating material on which a noble metal is sputtered or printed.

13. (Previously Presented) A method according to claim 12, wherein said piece of insulating material is comprised of a substance selected from the group consisting of glass, silicon, and quartz.

14. (Previously Presented) A method according to claim 1, wherein the noble metal surface obtained in step e) is at least 95% covered with a self-assembling monolayer.

15. (Previously Presented) A method according to claim 1, wherein the noble metal surface obtained in step e) is at least 97% covered with a self-assembling monolayer.

16. (Previously Presented) A method according to claim 1, wherein the noble metal surface obtained in step e) is at least 99% covered with a self-assembling monolayer.

17. (Previously Presented) A method according to claim 3, wherein said crosslinking substance is glutaraldehyde.

18. (Previously Presented) A method according to claim 5, wherein said second self-assembling monolayer-forming molecule is 1-dodecanethiol.

19. (Previously Presented) A sensor according to claim 6, wherein said piece of a noble metal is a rod.

20. (Previously Presented) A sensor according to claim 6, wherein said piece of a noble metal is a piece of insulating material on which a noble metal is sputtered.

21. (Previously Presented) A sensor according to claim 20, wherein said piece of insulating material is comprised of a substance selected from the group consisting of glass, silicon, and quartz.

22. (Previously Presented) A sensor according to claim 6, wherein said surface of said noble metal piece is at least 95% covered with a self-assembling monolayer.

23. (Previously Presented) A sensor according to claim 6, wherein said surface of said noble metal piece is at least 97% covered with a self-assembling monolayer.

24. (Previously Presented) A sensor according to claim 6, wherein said surface of said noble metal piece is at least 99% covered with a self-assembling monolayer.

25. (Previously Presented) A method for quantitatively determining the presence of a certain heavy metal ion of interest in a liquid sample, comprising the steps of:

a) providing a sensor according to claim 6;

b) contacting said sensor with a reference liquid not containing said heavy metal ion of interest and determining the capacitance;

c) contacting said sensor with a liquid sample suspected of containing said heavy metal ion of interest and determining the capacitance;

d) calculating the difference between the capacitance of the liquid sample and the capacitance of the reference liquid; and

e) calculating the amount of said heavy metal ion of interest using prerecorded calibration data.